from 1.10 percent of Gross National Product in 1986*87 to 0.9 percent at present, if go, the reasons therefor; and

(e) whether Government are considering to raise the percentage of investment in R&D in the light of liberalisation policy, if so, the details thereof ?

THE MINISTER OF STATE IN THE PRIME MINISTER'S OFFICE AND MINISTER OF STATE IN THE DEPARTMENTS OF ATOMIC ENERGY AND SPACE WITH ADDITIONAL CHARGE OF THE MINIS ILK OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY (SHRI BHUVNESH CHATURVEDI) : *(a)* Government expenditure on Research and Development during the last 3 years is as follows :

| Year | Rs. Crores |
|---|---|
| 1989-90 | 2933.92 |
| 1990-91 | 3328.11 |
| 1991-92 | 3827.33 (estimated) |

(b) Total R&D expenditure for USA, Germany, Japan and India for the latest three years available are given below :

**TOTAL R&D EXPENDITURE**

US$ Millions)

| Country | 1988 | 1989 | 1990 |
|---|---|---|---|
| USA | 134000 | 141000 | 146000 |
| Germany | 35000 | 36000 | 38000 |
| Japan | 54000 | 58000 | 63000 |
| India | 2400 | 2300 | 2400 |

SOURCE :

1. National Science Foundation for USA, West Germany' and Japan.

2. UNESCO for East Germany.

3. Department of Science & Technology for India.

(c) and (e) The government always gives encouragement to R&D in the country. S&T plan allocation by the government has increased from Rs. 5087 crores in Seventh Plan to Rs. 9389 crores in Eighth Plan.

(d) The national expenditure as percen-iage of GNP was 0.95 in 1986-87 and 0.89 in 1990-91. However, in absolute terms the R&D expenditure has been growing over the years.

**OBSOLETE SEISMIC MONITORING EQUIPMENT INSTALLED AT INDIAN METEOROLOGICAL DEPARTMENT**

3261. DR. NAUNIHAL SINGH :
SHRI SANGH PRIYA GAU-1AM :

Will the PRIME MINISTER be pleased to state :

(a) when the seismic monitoring equipment installed at the Indian Meteorological Department was procured;

(b) whether it is a fact that because cf the obsolete equipment, the Indian Meteorological Department had no clue about the devastating earthquake in Maharashtra;

(c) if so, who is responsible for this neglect and what action has been taken against the officials for dereliction of their duty; and

(d) what are the future pains of the Indian Meteorological Department to modernise the seismic monitoring depart' ment ?

THE MINISTER OF STATE IN THE PRIME MINISTER'S OFFICE AND MINISTER OF STATE IN THE DEPARTMENTS OF ATOMIC ENERGY AND SPACE WITH ADDITIONAL CHARGE OF THE MINISTER OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY (SHRI BHUVNESH CHATURVEDI) *: (a) During 1990's digital seismographs have been installed at five observatories of India Meteorological Department at New Delhi, Shillong, Pune, Kodaikanal and Dharamsala (HP). Under a collaboration programme between Department of Science & Technology and Russia, 10 broad band seismographs are being procured from Special Design Bureau, Russia for further modernisation.

Since 1979, a digital and analog seismic research observatory with bore hole sensors was started by IMD at Shillong in collaboration with United States Geological Survey.

During 1962-94, in collaboration with United State Geological Survey, IMD established 4 observatories equipped with modeln equipments at Delhi, Pune, Kodaikanal and Shillong. Tnese 4 observatories from a part of World-wide Network ef Seismological Stations.

(b) No, Sir There is no- equipment and technology. available anywhere in the world to predict earthquakes in time, space and magnitude with reasonable accuracy.

(c) Question does not arise.

(d) l.M.D. has been replacing the old sype of seismographs with modern instruments in a phased programme. During the 8th Five Year Plan period 8 new observatories are planned to be equipped with state-of-art technology and 8 other stations modernised. In the Mission Mode Project, now under formulation by the Department of Science and Technology. The India Meteorological department proposes to set up more observatories equipped with modern equipment.

**RESEARCH WORK ON THE EARTHQUAKE PREDICTION TECHNIQUES**

3262. SHRI V. NARAYANASAMY : Will the PRIME MINISTER be pleased lo state :

(a) whether Government's attention has been drawn to a newsiteni in Hindustan Times of 2nd October, 1993 that recently a controversy had broken out between two top scientists over the research on prediction of earthquake in the earthquake-bound Killari area of Western Maharashtra;

(b) if so, the reaction of Government thereto and the steps taken by Government for forewarning people correctly by the scientists by using the modern techniques so that the people could be moved to safer places to minimise the loss of lives;

(c) what budget provision has been made by Government in regard to such research by scientists in CSIR and other research institutions and whether the provision made is sufficient to carry out such researches on a large scale keeping in mind the large scale losses suffered in Maharashtra; and